

*Please provide the following information, and submit to the NOAA DM Plan Repository.*

**Reference to Master DM Plan (if applicable)**

*As stated in Section IV, Requirement 1.3, DM Plans may be hierarchical. If this DM Plan inherits provisions from a higher-level DM Plan already submitted to the Repository, then this more-specific Plan only needs to provide information that differs from what was provided in the Master DM Plan.*

URL of higher-level DM Plan (if any) as submitted to DM Plan Repository:

**1. General Description of Data to be Managed****1.1. Name of the Data, data collection Project, or data-producing Program:**

AFSC/RACE/SAP: Detailed Crab Data From NOAA Fisheries Service Annual Eastern Bering Sea Summer Bottom Trawl Surveys 1975 - 2015

**1.2. Summary description of the data:**

This dataset contains detailed crab data collected from the annual NOAA/NMFS/AFSC/RACE crab-groundfish bottom trawl survey of the eastern Bering Sea continental shelf. The standard survey area, surveyed each year since 1975, encompasses a major portion of the eastern Bering Sea shelf between the 20 meter and 200 meter isobaths and from the Alaska Peninsula to the north of St. Matthew Island. The study area is divided into a grid with cell sizes of 20 x 20 nautical miles (37 x 37 kilometers). Sampling takes place within each 20 x 20 nautical mile grid cell. In areas surrounding St. Matthew (1983-present) and the Pribilof Islands (1981-present), grid corners were also sampled to better assess king crab concentrations. In 1975, tows were 1 hour in duration; from 1976 to present, each tow is one-half hour in duration, averaging 1.54 nautical miles (2.86 kilometers) - exact tow duration and distance fished for each haul can be found in RACEBASE.HAUL. 100% of the catch is sorted for red, blue, and golden king crab, bairdi Tanner, snow crab, hybrid Tanner, and hair crab. Crabs are sorted by species and sex, and a sample is measured to the nearest millimeter to provide a size-frequency distribution (see note under use constraints for analyzing catches where crab were subsampled for measurement). Carapace width is measured for Tanner crabs, and carapace length is measured for king and hair crabs.

**1.3. Is this a one-time data collection, or an ongoing series of measurements?**

One-time data collection

**1.4. Actual or planned temporal coverage of the data:**

1975-06 to 2015-08

**1.5. Actual or planned geographic coverage of the data:**

W: -178.74067, E: -157.97861, N: 68.3, S: 53.81867

More elaborate than a keyword.

**1.6. Type(s) of data:**

(e.g., digital numeric data, imagery, photographs, video, audio, database, tabular data, etc.)  
Table (digital)

**1.7. Data collection method(s):**

(e.g., satellite, airplane, unmanned aerial system, radar, weather station, moored buoy, research vessel, autonomous underwater vehicle, animal tagging, manual surveys, enforcement activities, numerical model, etc.)

Instrument: Not Applicable

Platform: Not Applicable

Physical Collection / Fishing Gear: Not Applicable

**1.8. If data are from a NOAA Observing System of Record, indicate name of system:****1.8.1. If data are from another observing system, please specify:****2. Point of Contact for this Data Management Plan (author or maintainer)****2.1. Name:**

Claire Armistead

**2.2. Title:**

Metadata Contact

**2.3. Affiliation or facility:**

Alaska Fisheries Science Center

**2.4. E-mail address:**

claire.armistead@noaa.gov

**2.5. Phone number:**

907 481 1730

**3. Responsible Party for Data Management**

*Program Managers, or their designee, shall be responsible for assuring the proper management of the data produced by their Program. Please indicate the responsible party below.*

**3.1. Name:**

Claire Armistead

**3.2. Title:**

Data Steward

**4. Resources**

*Programs must identify resources within their own budget for managing the data they produce.*

**4.1. Have resources for management of these data been identified?**

No

**4.2. Approximate percentage of the budget for these data devoted to data management (specify percentage or "unknown"):**

Unknown

**5. Data Lineage and Quality**

*NOAA has issued Information Quality Guidelines for ensuring and maximizing the quality, objectivity, utility, and integrity of information which it disseminates.*

**5.1. Processing workflow of the data from collection or acquisition to making it publicly accessible**

*(describe or provide URL of description):*

Process Steps:

- Trawl samples take place within 20 x 20 nautical mile grid cells throughout the eastern Bering Sea shelf. In areas surrounding St. Matthew (1983-present) and the Pribilof Islands (1980-present), grid corners were also sampled to better assess king crab concentrations. In 1975, tows were 1 hour in duration; from 1976 to present, each tow is one-half hour in duration, averaging 1.54 nautical miles (2.86 kilometers) - exact tow duration and distance fished for each haul can be found in RACEBASE.HAUL.
- All crab were removed from the catch, sorted by species and sex, and a total catch weight was obtained for each species. Tanner and snow crab hybrids are identified by a combination of characteristics including curve of the epistome margin, eye color, carapace shape, and space between or shape of the rostrum horns. A random subsample of the total catch occurred when an exceptionally large number (> 300) of a species was caught in a tow. The subsample varies in size and composition depending on the particular tow. The subsample may have occurred at the level of the entire catch or at the level of a particular size and sex category once the catch was sorted. The total weights of the sampled crab and non-sampled crab were recorded and an expansion factor was calculated to determine the final number of each species in the catch. Individual crab carapaces were measured ( $\pm 1$  mm) to provide a size-frequency distribution of each sample. Crab sizes are reported as carapace width (CW) excluding spines for Tanner and snow crab, and carapace length (CL) for all king crab and hair crab. Since 2006, individual weights were measured for blue king crabs every year, red king crab and snow crab in odd years, and for Tanner crab in even years to add to the existing length-weight data and to monitor temporal variability in length-weight regressions. For every haul in 2014, data were collected on up to five intact crab per each of the following categories: 1) male Tanner crab, 2) ovigerous Tanner crab, and 3) non-ovigerous female Tanner crab. Because of their relative rarity, weight data were collected for all intact blue king crabs encountered that met the sampling requirements (i.e., whole, live crab without regenerating limbs). Weights were collected from representative size ranges throughout the spatial distribution of each species. Measurements were regionally stratified and tally sheets ensured all size ranges were equally sampled within each region. In the absence of specific age data, shell condition

classification by length and sex is necessary for apportioning stock abundance and biomass for determination of stock status, analytical stock assessment, and for establishing annual management controls. Shell condition class serves as a semi-quantitative index of molt status and time in shell post-molt. For all EBS crab stocks, and particularly those which exhibit a terminal molt at maturity (i.e., *Chionoecetes* spp.), shell condition is a requisite for setting overfishing limits and harvest quotas. Carapace shell condition was assessed for each crab sampled and assigned to one of six classes according to specific criteria (0 = premolt or molting, 1 = soft and pliable, 2 = new hardshell both firm and clean, 3 = oldshell slightly worn, 4 = oldshell worn, 5 = very oldshell). Clutch assessment is used to estimate spawning stock biomass and overall reproductive health and to monitor demographic changes in the mating population. All female crab abdomens were evaluated to determine reproductive condition based on the color of the eggs (0 = no eggs, 2 = purple, 3 = brown, 4 = orange, 5 = purple-brown, 6 = pink), the condition of the eggs (0 = no eggs, 1 = uneyed, 2 = eyed, 3 = dead, 4 = empty egg cases), and the size of the egg clutch (0 = immature, 1 = mature female no eggs, 2 = trace to 1/8, 3 = 1/4, 4 = 1/2, 5 = 3/4, 6 = full).

For mature females, egg clutch and egg condition codes were used to identify the stage in the molt-mate cycle, where the presence of eyed embryos, empty egg cases, or absence of eggs (barren, hereafter) in mature-sized females were indications of an incomplete cycle while mature females brooding uneyed embryos indicated completion of the cycle.

- Data collected at sea is uploaded to an Oracle database and subjected to a thorough QA/QC process.
- Catch-per-unit-effort (CPUE), abundance, and biomass estimates are calculated by species and by stock. Area swept is calculated as the product of the distance trawled while the net had bottom contact by the mean net width over the duration of the tow. CPUE is expressed in terms of number (or weight) of crab per square nautical mile. Biomass estimates are calculated for the number of individual male and female crab species at each 1 mm size category using the weight-size relationships developed by the AFSC's Kodiak Laboratory. Prior to 2010, the weight-size relationships were based on limited data (< 500 samples for all species) and estimates from survey data total weights. In 2010 the relationships were revised based on species-specific length and weight data collected during EBS surveys from 2006 to 2010 from > 1,000 measurements made for each species. Length and weight data currently being collected on the survey annually will be used to assess relative changes to the relationship overtime and correlated with environmental variables. The size-weight relationships are described by the expression:  $W = aL^b$ , where W is the total weight in grams, L is either CL or CW in millimeters, a is the intercept in log scale and b is the slope. Parameters a and b for the size-weight relationships are estimated from a linear regression fitted to log-transformed size-weight data. The weights calculated at each 1 mm size category are summed within the legal male, sublegal male, mature and immature size categories for each species and sex caught at a station. The crab biomass within a district or section stratum was estimated by averaging crab densities from all stations within the defined district

or section stratum and multiplied by the total area of the district or section stratum specific to that stock. Total biomass was calculated using a stratified design based on management units (standard density, high density, Alaska Department of Fish & Game-defined districts, or section stratum). Population biomass estimates were calculated in each stratum and then summed among strata. Variance of the total biomass estimate for each size class was calculated by summing the variance of each stratum. The 95% confidence intervals were calculated using the standard error of the total population multiplied by 1.96.

**5.1.1. If data at different stages of the workflow, or products derived from these data, are subject to a separate data management plan, provide reference to other plan:**

**5.2. Quality control procedures employed (describe or provide URL of description):**

Data is submitted through a thorough QA/QC process. Data is checked for outliers, impossible values, and invalid values.

## **6. Data Documentation**

*The EDMC Data Documentation Procedural Directive requires that NOAA data be well documented, specifies the use of ISO 19115 and related standards for documentation of new data, and provides links to resources and tools for metadata creation and validation.*

**6.1. Does metadata comply with EDMC Data Documentation directive?**

Yes

**6.1.1. If metadata are non-existent or non-compliant, please explain:**

**6.2. Name of organization or facility providing metadata hosting:**

NMFS Office of Science and Technology

**6.2.1. If service is needed for metadata hosting, please indicate:**

**6.3. URL of metadata folder or data catalog, if known:**

<https://inport.nmfs.noaa.gov/inport/item/17108>

**6.4. Process for producing and maintaining metadata**

*(describe or provide URL of description):*

Metadata produced and maintained in accordance with the NMFS Data Documentation Procedural Directive: <https://inport.nmfs.noaa.gov/inport/downloads/data-documentation-procedural-directive.pdf>

## **7. Data Access**

*NAO 212-15 states that access to environmental data may only be restricted when distribution is explicitly limited by law, regulation, policy (such as those applicable to personally identifiable*

*information or protected critical infrastructure information or proprietary trade information) or by security requirements. The EDMC Data Access Procedural Directive contains specific guidance, recommends the use of open-standard, interoperable, non-proprietary web services, provides information about resources and tools to enable data access, and includes a Waiver to be submitted to justify any approach other than full, unrestricted public access.*

**7.1. Do these data comply with the Data Access directive?**

Yes

**7.1.1. If the data are not to be made available to the public at all, or with limitations, has a Waiver (Appendix A of Data Access directive) been filed?**

**7.1.2. If there are limitations to public data access, describe how data are protected from unauthorized access or disclosure:**

**7.2. Name of organization of facility providing data access:**

Alaska Fisheries Science Center

**7.2.1. If data hosting service is needed, please indicate:**

yes

**7.2.2. URL of data access service, if known:**

<https://www.ncei.noaa.gov>

**7.3. Data access methods or services offered:**

unknown

**7.4. Approximate delay between data collection and dissemination:**

unknown

**7.4.1. If delay is longer than latency of automated processing, indicate under what authority data access is delayed:**

No delay

**8. Data Preservation and Protection**

*The NOAA Procedure for Scientific Records Appraisal and Archive Approval describes how to identify, appraise and decide what scientific records are to be preserved in a NOAA archive.*

**8.1. Actual or planned long-term data archive location:**

*(Specify NCEI-MD, NCEI-CO, NCEI-NC, NCEI-MS, World Data Center (WDC) facility, Other, To Be Determined, Unable to Archive, or No Archiving Intended)*

NCEI-MD

**8.1.1. If World Data Center or Other, specify:**

**8.1.2. If To Be Determined, Unable to Archive or No Archiving Intended, explain:**

**8.2. Data storage facility prior to being sent to an archive facility (if any):**

Alaska Fisheries Science Center - Seattle, WA

**8.3. Approximate delay between data collection and submission to an archive facility:**

Unknown

**8.4. How will the data be protected from accidental or malicious modification or deletion prior to receipt by the archive?**

*Discuss data back-up, disaster recovery/contingency planning, and off-site data storage relevant to the data collection*

IT Security and Contingency Plan for the system establishes procedures and applies to the functions, operations, and resources necessary to recover and restore data as hosted in the Western Regional Support Center in Seattle, Washington, following a disruption.

**9. Additional Line Office or Staff Office Questions**

*Line and Staff Offices may extend this template by inserting additional questions in this section.*